

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
17 January 2002 (17.01.2002)

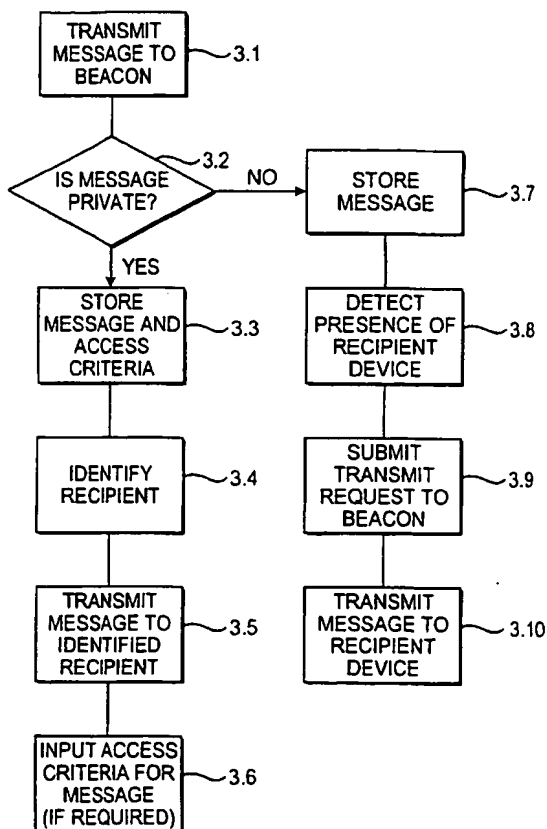
PCT

(10) International Publication Number  
**WO 02/05435 A2**

- (51) International Patent Classification<sup>7</sup>: **H04B** (72) Inventors: **HILTUNEN, Miska**; Breite Strasse 86a, 58452 Witten (DE). **LEMPIO, Jarkko**; Antinkatu 1 B, FIN-37100 Nokia (FI).
- (21) International Application Number: PCT/IB01/01063
- (22) International Filing Date: 14 June 2001 (14.06.2001) (74) Agent: **STUART, Michael, C.**; Cohen, Pontani, Lieberman & Pavane, Suite 1210, 551 Fifth Avenue, New York, NY 10176 (US).
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 09/612,872 10 July 2000 (10.07.2000) US
- (71) Applicant: **NOKIA CORPORATION** [FI/FI]; Keilalahdentie 4, FIN-02150 Espoo (FI).
- (71) Applicant (for LC only): **NOKIA INC.** [US/US]; 6000 Connection Drive, Irving, TX 75039 (US).
- (81) Designated States (*national*): AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European

[Continued on next page]

(54) Title: SHORT MESSAGING USING INFORMATION BEACONS



(57) Abstract: A short messaging communication system for communicating short messages to a user located in an operating region of the system. Information beacons or beacons which function as store and forward devices operable in a corresponding local operating region communicate with terminal devices that are located within the local operating region. Short messages can be "private" messages wherein only specified recipients are permitted access, or "public" messages whose access is not limited to specific users. A message stored on a beacon can be retrieved by a recipient when the recipient's presence in the operating range is detected, whereupon the beacon will wirelessly transmit the message to the recipient device. For private messages, a password or other security access code may be required for input into the receiving device to decipher the received message.

WO 02/05435 A2



patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Published:**

— *without international search report and to be republished upon receipt of that report*

## Short Messaging Using Information Beacons

BACKGROUND OF THE INVENTION1. Field of the Invention

5           The present invention relates to local communication networks and, more particularly, to wireless short message communication systems.

2. Description of the Related Art

10           The availability of various types of wireless communication devices produces a need to have these devices interact with each other in a manner which is cost efficient and which can be easily implemented. Such communication can occur in GSM systems using SMS wherein  
15 short messages are communicated directly between two or more terminal devices, such as mobile stations, e.g. telephones, PDAs, etc. Terminal devices can also communicate with each other using infrared signals or radio frequency (RF) signals.

20           Recently, low power RF systems have been proposed for providing communications between a plurality of transceivers through a short-range radial link having a broadcast range of several meters. One such local RF system is currently under development and is referred to  
25 as "Bluetooth". This system will be commercially available in the near future and is designed to operate in the open spectrum, around 2.4 gigahertz. The Bluetooth system will allow for devices such as mobile phones, computers, and other types of terminal devices  
30 which are located within an operable range of the RF system to communicate with each other.

Wireless relay networks also exist which, in effect, extend an operating range of a local RF system by utilizing relay devices to interface with and provide

communication between two or more terminal devices. Such a network is disclosed in PCT Application No. WO 98/17032, wherein a plurality of communication nodes are wirelessly connected to each other and to a host device  
5 for providing numerous communication links for data to be communicated between the host and terminal devices interfaced with the nodes. Such systems do not, however, make transmission of communications dependant on a location of an intended recipient, which is a desired and  
10 worthwhile feature in many circumstances.

#### SUMMARY OF THE INVENTION

The present invention is directed to a short messaging service for use with one or more information  
15 transceiver beacons. The beacons have a corresponding local geographic operating area defining a region in which the beacon can wirelessly communicate with a terminal device contained in the operating area. A short message is stored on a subject beacon for receipt by one  
20 or more intended recipients. When a terminal device of an intended recipient enters the operating area of the subject beacon, the message is transmitted by the beacon to the terminal device. The beacons may be stand alone devices or may be incorporated in a wireless local area  
25 network having a plurality of wireless transceiver beacons in communication with each other.

In a preferred embodiment, the stored short message may contain a security access feature to allow access only to one or more intended recipients, which may  
30 be accomplished by entering a security code in the terminal device of the intended recipient to the beacon. The message may be transferred from a terminal device directly to a subject beacon, or indirectly via a first beacon or a host in communication with the subject

beacon, or from a device outside of the network by accessing a beacon or the network through a corresponding access address.

In another preferred embodiment, the message  
5 may contain a time limitation parameter for establishing a time period during which the message will be available. In the event transmission does not occur within the preset time period, the message will be deleted. If successful transmission occurs within the time period,  
10 the message will also be deleted.

In still another preferred embodiment, the message may be a public message accessible by any recipient that enters the operating region of the beacon. Such a message may be used, for example, in advertising  
15 by conveying information concerning a promotional offer by a particular retail establishment located in the operating region of the beacon.

In yet another embodiment, a message may be broadcast to a plurality of beacons in communication with  
20 each other and the message will be transmitted from any one of the plurality of the beacons to an intended recipient device when the intended device is detected within a transmission area of any of the plurality of beacons. Once the message is successfully transmitted,  
25 it will be removed from all of the beacons in the plurality.

#### BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, wherein like reference  
30 numerals denote similar elements throughout the several views:

FIG. 1 is a graphical representation of a system for communicating short messages in accordance with the present invention;

FIG. 2 is a schematic representation of a short range RF network for use in accordance with a preferred embodiment of the present invention;

FIG. 3 is a flow chart illustrating the communication functions in accordance with the present invention;

FIG. 4 is an illustration of an information beacon in accordance with the inventive system;

FIG. 5 is an illustration of a terminal device for use with the inventive system; and

FIG. 6 is a schematic representation of a plurality of remotely accessible short-range RF networks.

DETAILED DESCRIPTION OF THE PRESENTLY PREFERRED EMBODIMENTS

FIG. 1 depicts an information beacon 14 operable in an operating range 5 for communicating with one or more wireless terminal devices, such as PDAs or mobile phones  $P_1$ ,  $P_2$  which are located within the operating range 5. The term beacon refers to a wireless store/forward transceiver relay device, as explained more fully below, for storing short messages and transmitting the stored messages to one or more terminal devices.

In one embodiment, a network of beacons 14 may be employed in a short range RF network or local area network (LAN) 10 illustrated in FIG. 2. Network 10 includes a plurality of wireless transceiver beacons 14 connected either directly or indirectly to a host 12 through a plurality of communication paths 16. In the example shown in FIG. 2, three direct paths, 16a, 16b and 16c, are generally shown for connecting the beacons 14a, 14b, 14c, to the host 12. Each communication path is made up of a direct link 18a, 18b, 18c, defined as a wireless connection between the host 12 and a beacon 14a<sub>1</sub>,

14b<sub>1</sub>, 14c<sub>1</sub>, and may include one or more indirect links 20a and 20b<sub>1</sub>-20b<sub>4</sub>, defined as a wireless connection between two beacons. In the network 10, path 16a is made up of a direct link 18a between beacon 14a<sub>1</sub> and host 12, and an indirect link 20a between beacons 14a<sub>2</sub> and 14a<sub>1</sub>. Thus, beacon 14a<sub>2</sub> communicates with host 12 only through the use of beacon 14a<sub>1</sub> in path 16a. Path 16c includes only a single direct link 18c between beacon 14c<sub>1</sub> and host 12. As for path 16b, this includes a direct link 18b between beacon 14b<sub>1</sub> and host 12 and also contains a plurality of indirect links 20b<sub>1</sub>, 20b<sub>2</sub>, 20b<sub>3</sub> and 20b<sub>4</sub>, which provide a communication path between host 12 and beacons 14b<sub>2</sub>, 14b<sub>3</sub> and 14b<sub>4</sub>.

As shown in path 16b, certain beacons establish multiple communication links through which communication with the host 12 can occur. For example, beacon 14b<sub>3</sub> can communicate with beacon 14b<sub>1</sub> and, ultimately, with host 12 through either beacon 14b<sub>2</sub> via intermediate paths 20b<sub>2</sub> and 20b<sub>4</sub> or through beacons 14b<sub>4</sub> and 14b<sub>2</sub> through intermediate paths 20b<sub>1</sub>, 20b<sub>3</sub> and 20b<sub>4</sub>.

The host 12 is responsible for routing data to the beacons in the network 10 and may interface the network 10 with an external network such as the Internet 2, in a manner well-known to those having ordinary skill in the art. For example, the interface can be a connection 4 which may be a fiber optic or other "hard-wired" connection scheme, wireless low power RF connections (e.g. Bluetooth), cellular connection, infrared and modem. The host 12 is preferably a personal computer having low power RF communication ability including custom designed software for network administration. The host serves as a central maintenance unit for storing a running inventory register of beacons, as explained below, to which the host is connected, as

well as the manner in which the beacons are connected to each other, e.g., through direct links 18a, 18b, 18c or indirect links 20. The inventory register can be based, for example, on Bluetooth device addresses. Moreover, 5 the host 12 can interface with one or more additional hosts (not shown) depending on the requirements or demands of the network 10.

The beacons 14 are relatively small, portable transceiver devices which communicate data between 10 themselves and the host 12 along direct links 18 and indirect links 20 of communication paths 16 in the network 10. Each beacon 14 includes an RF receiver and transmitter capable of receiving and transmitting data over the operative range of the RF receiver. For example, 15 if Bluetooth technology is employed, the operating range of each beacon and, consequently, the distance between adjacent beacons in a network (i.e. the length of each link) using current technology is in the range of approximately 10 meters for a normal power mode and 300 20 meters for a high power mode.

A detail of a preferred beacon device 14 is illustrated in FIG. 4. The beacon includes a central processing unit (CPU) 302 interfaced with one or more short range transceivers 308, 310, 312 for communicating 25 with other beacons 14 or hosts 12. A memory 304 and storage area 306 are provided for storing application software as well as data to be communicated to intended recipients, as explained more fully below.

Each beacon functions as a transceiver device 30 and is operable in a corresponding region 5 (shown in FIG. 1), typically defined by the radius of its transmission range. Thus, for a 10 meter operating range, each beacon 14 will be able to communicate with devices contained within a circular geographic area



defined by the operating range and centered at the location of the beacon 14. Such communication may be between a subject beacon (e.g. beacon 14b<sub>3</sub>) and one or more neighboring beacons (e.g. 14b<sub>2</sub>, 14b<sub>4</sub>) or between a  
5 subject beacon and one or more mobile devices such as, for example, a personal digital assistant (PDA) or mobile telephones shown as P<sub>1</sub> and P<sub>2</sub>.

A detail of the terminal device or mobile phone P<sub>1</sub> is illustrated in FIG. 5. As shown, the mobile  
10 phone includes a display 202, such as an LCD display as is known in the art, a central processing unit (CPU) 208 and a memory 210. Standard mobile transmission and reception occurs via a network transceiver 206 connected to an antenna 212, and short messaging for communication  
15 with a subject beacon 14 is conducted via a short range transceiver 204 connected to the antenna.

For the mobile devices to communicate with the beacon or with the network 10, each device will have a designated address code, such as an e-mail address. As  
20 shown in FIG. 2, telephone P<sub>1</sub> is illustratively located within the operating ranges of beacons 14b<sub>3</sub> and 14b<sub>4</sub> and telephone P<sub>2</sub> is illustratively located within the operating range of beacon 14b<sub>3</sub>. It will be appreciated that as the telephones P<sub>1</sub>, P<sub>2</sub> are mobile devices, their  
25 exact positions relative to specific beacons are dynamically changing as a telephone user moves about an environment in which the information beacons 14 or the network 10 operates. Thus, at a later time telephone P<sub>2</sub> may be in the operating range of beacon 14b<sub>1</sub> while  
30 telephone P<sub>1</sub> moves within the operating range of beacon 14c<sub>1</sub>.

Each beacon 14 functions as a store and forward device for providing communication of messages between the mobile devices P<sub>1</sub>, P<sub>2</sub>. The messages may be intended

for receipt by one or more specific or designated recipients based on the recipient identification ("private messages") or may be accessible to multiple recipients without the requirement of recipient  
5 identification ("public messages"). The communication of both types of messages are discussed more fully below.

To communicate with the beacons 14, the mobile devices include a low power infrared or RF communication feature, such as Bluetooth, as is known in the art. It  
10 is presently contemplated that communication between a mobile device and a particular beacon will be limited to relatively short text messages in a manner analogous to the Short Message Service available in present GSM systems, but may also include audio messages and larger  
15 text messages. To forward a private message to a particular beacon (e.g. 14b<sub>3</sub>) from device P<sub>1</sub>, the device must be capable of communicating either directly or indirectly with beacon 14b<sub>3</sub>. This is accomplished by activating a low power RF communication feature of the  
20 device P<sub>1</sub> (e.g. a Bluetooth chip) and positioning the device P<sub>1</sub> within the operating range of beacon 14b<sub>3</sub>. A text or audio message can then be created and transmitted, in a known manner, along with an address (e.g., e-mail address) of an intended recipient, for  
25 temporary storage in a memory location of the receiving beacon (14b<sub>3</sub>). The message can be designated for storage on a particular beacon (e.g., 14b<sub>3</sub>) or for storage on some or all beacons in direct or indirect communication with beacon 14b<sub>3</sub>, e.g., a broadcast message to a plurality of  
30 beacons.

As an alternative to directly communicating with beacon 14b<sub>3</sub> and transmitting a message for storage, indirect communication can occur by, for example, transmitting a message through the network 10 to beacon

14b<sub>4</sub> and providing a destination address to allow the message to be forwarded to beacon 14b<sub>3</sub>. This allows for the message sender (i.e. the operator of device P<sub>1</sub>) to be in the operating range of beacon 14b<sub>4</sub> and not within the  
5 operating range of beacon 14b<sub>3</sub>. One circumstance in which this feature may be useful is in coordinating a time for a meeting scheduled to take place within an operating environment of the network 10. For example, if a meeting place within the operating range of beacon 14b<sub>3</sub> was  
10 previously scheduled by a party who is within the operating range of a remote beacon (e.g. beacon 14b<sub>1</sub>) and who is going to be delayed, the delayed party can forward a message through beacon 14b<sub>1</sub> to beacon 14b<sub>3</sub> via communication links 20b<sub>4</sub>, 20b<sub>2</sub>, to inform an intended  
15 recipient that there will be a delay to the meeting.

For private messages which are intended to be selectively received by one or more intended recipients (e.g. a select group), the message must be stored on a desired beacon and retrieved from the desired beacon in a  
20 manner for preventing unintended mobile devices from gaining access to the message. To accomplish this task in accordance with the present invention, secrecy or encoding techniques are employed. Although a plurality of such techniques are widely available, the presently  
25 preferred embodiment utilizes PGP encryption for this purpose. This requires the message sender and recipient(s) to be previously identified to each other by exchanging so-called "public keys" which the respective sender will use to encrypt and transmit a message to a  
30 beacon for storage. Upon transmission of the stored message to the intended recipients, the intended recipients will be able to decode the message upon entry of a password, as is known in the art.

One of the various alternatives to PGP encryption is assigning each user address (e.g. e-mail address) with a corresponding password that will be used to access a message stored by a sender. In such a system, the sender will use the recipient's e-mail address to transmit the message to a desired beacon for storage and the recipient will gain access to the message by entering the recipient's password. Thus, the password will be entered onto the recipient's device (e.g.,  $P_2$ ) when access to messages is desired. The verification of the password is preferably performed in the recipient device, which will insure that the beacon architecture design can remain relatively simple and transparent with standard memory and transceiver electronics (e.g., Bluetooth chips) without requiring the storing of operation of verification software for confirming password validity, etc. However, password verification at the recipient device may pose certain security risks, especially if the password is saved in memory contained in the recipient device. To alleviate or reduce this risk, the mobile devices may contain security information in the device application software necessary to guarantee the user identity such as by including a hard-coded security algorithm that is unable to be duplicated.

As explained above, private messages are intended to be received by one specific recipient or by a group of recipients. Private messages are transmitted from a subject beacon (e.g.,  $14b_3$ ), or in the case of a broadcast message which is stored on a plurality of subject beacons, to an intended recipient when the intended recipient enters into the operating range of the beacon and the intended recipient device is detected. To accomplish this, the intended recipient device must be activated for automatic access, i.e. the Bluetooth

function or the infra-red function is operating, to identify the recipient device to the transmitting beacon. Once the recipient device is identified (e.g., "connected" to the network 10), the private message will  
5 be transmitted automatically from one of the subject beacons containing the private message. After receipt, the message can be decrypted such as by entering an encryption password on an input (e.g. a keyboard) of the receiving device, whereupon the message is conveyed to  
10 the recipient in text, audio or other format. After the recipient receives a private message, a reply can be sent solely to the transmitting beacon or as a broadcast signal to multiple beacons for receipt by the message originator, by utilizing the message originator's address  
15 and the sender's password.

The inventive method described above for communicating a private message from a sender to a recipient through the use of a beacon is illustrated in FIG. 3. When a private message is prepared by a sender,  
20 it is encrypted and transmitted to a designated beacon. The transmission may occur directly between a sender's device and the designated beacon by transmitting the message (step 3.1) within a corresponding operating range of the beacon, or indirectly, as explained above, via use  
25 of another beacon in communication with the designated beacon. A determination as to whether the message is private will then be made (step 3.2) by detecting, for example, a security code or an encryption format. The private message will then be stored in memory on the  
30 designated beacon with a security code (step 3.3). When an activated recipient device enters the operating range of the designated beacon, the beacon will sense or become aware of the recipient (step 3.4) by detecting, for example, a Bluetooth signature, SIM card or other

corresponding address code associated with the intended recipient or recipient device, and transmit the stored message (step 3.5). Upon receipt, the recipient can enter a decryption code or password, if required, to  
5 decipher or gain access to the received message (step 3.6).

Once the private message is successfully transferred, it will either be deleted from the beacon memory, as in the case of only one intended recipient, or  
10 will no longer be available to the recipient that received the message but will still be available to other intended recipients. As a further safeguard against exceeding the memory storage capacity of the beacons, the private messages may be created with or may have a  
15 standard time delivery limitation. For example, a message sender may set a time parameter for a message to be available for a time duration (e.g., 2 hours) or up to a specific time (e.g. 2:00 P.M.). Moreover, each beacon can be designed to delete private messages after a preset  
20 time period expires (e.g. after 3 hours, at 12:01 A.M. of every day, etc.).

While the delivery of private messages involves security concerns to safeguard against non-intended recipients receiving messages, the communication of  
25 "public" messages do not possess such concerns. Public messages may be used, for example, in advertising, to inform potential customers of sales promotions offered by an establishment proximate a specific beacon. As users enter the operating area of the specific beacon the user  
30 may obtain access, in a manner explained more fully below, to a message describing the particular sales promotion. Public messages may also include for example general information related or tailored to a geographic location containing the subject beacon, such as providing

mass transit time tables for trains or buses departing from or arriving at the geographic location, as well as theater performance times, for events at a theatre in the operating range of the subject beacon, etc.

5           Although intended recipients of private messages are preferably alerted when they enter into an operating range of a beacon, recipients of public messages may be required to request delivery of public messages. The public messages can be created by, for  
10           example, a service provider of one or more networks 10 and stored in location specific destinations to maximize user accessibility and use of the public messages. With reference to FIG. 6, for example, a system is depicted having a plurality of networks or LANs (10<sub>1</sub>, 10<sub>2</sub>, 10<sub>3</sub>,  
15           10<sub>4</sub>) each containing a plurality of beacons (in FIG. 6, only one beacon BT is shown for each LAN as 14<sub>1</sub>, 14<sub>2</sub>, 14<sub>3</sub>, 14<sub>4</sub>, respectively). The LANs are connected through the Internet 2 to one or more service providers which operate the LANs. The service providers preferably  
20           operate the LANs and may also control the public messages intended for storage on the individual beacons. Thus, if a commercial establishment desires to have a particular public message posted on a beacon (e.g. a beacon having a transmission area in which the  
25           commercial establishment or a competitor is located), the appropriate service provider would be contacted. The service provider can then access the desired LAN and beacon, such as via the Internet using appropriate software applications and addresses, to store the  
30           desired message. If one of the networks (e.g. LAN 10<sub>1</sub>) operates in a shopping center containing various types of retail establishments, public messages may be created and strategically placed at appropriate beacons (e.g., BT 14<sub>1</sub>) positioned proximate certain retail establishments to

alert potential patrons in the vicinity of the specific retail establishments of available promotional offers. For example, a public message containing information on a clothing sale offered by a store proximate a specific information beacon containing the message will be transmitted to devices (e.g.,  $P_1$ ) that are within the operating range of the specific beacon 14<sub>1</sub>. This process is generally depicted in steps 3.7 - 3.10.

In one alternative, the public messages may be stored in categories by subject matter. Access to messages can then be requested by a recipient when the recipient enters into the operating range of a specific beacon. For example, a recipient can execute a command on a terminal device to receive a category list or menu of messages (e.g. clothing offers, food promotion, etc.) and then select the category of messages to be transmitted by the beacon. Once the category is transmitted, the messages in the category can be viewed and a particular message can be selected for transmission by the beacon to the recipient device. Alternatively, public messages can be automatically transferred to a recipient device upon entry of the recipient into the operating area of the beacon, i.e. without requiring the user to initiate a request to the beacon.

The network 10 also functions as an electronic message center or "bulletin board" wherein users can access information posted by other users (either directly or through the service providers) on one or more beacons which are strategically located in high user traffic areas such as an entrance to a shopping center. As an example, if a user wants to post a message or advertisement concerning the user's sale of an item, such as furniture, the user will send a short message request to a desired beacon where the



advertisement is to be stored. The user may then receive a message from the beacon containing an information solicitation form seeking certain information from the user (e.g. the price of the item for sale and, optionally, a digital image of the item). The information is then provided by the user to the beacon for storage. When a second user enters the operating range of the subject beacon containing the first user's stored message, the second user may send a SMS message request to the beacon for all "sale" items. The second user will receive, in response, a message containing a list of categories for sale items. The user can then scroll through the list to find the "furniture" category and then select the desired message, whereupon the beacon will transmit the first user's message to the second user's mobile phone.

For public messages, a beacon may be designated as an "information beacon" which functions as a storing device and which is in communication, either directly or indirectly with other beacons in the network. Thus, a recipient of a public message can communicate a request, through a beacon presently servicing the recipient device, to transmit all or select public messages to the recipient device. This will cause the select public messages to be retrieved from the information beacon and transmitted, either directly or indirectly, to the recipient device.

Thus, while there have shown and described and pointed out fundamental novel features of the invention as applied to a preferred embodiment thereof, it will be understood that various omissions and substitutions and changes in the form and details of the devices illustrated, and in their operation, may be made by those skilled in the art without departing from the

spirit of the invention. For example, it is expressly intended that all combinations of those elements and/or method steps which perform substantially the same function in substantially the same way to achieve the same results are within the scope of the invention. Moreover, it should be recognized that structures and/or elements and/or method steps shown and/or described in connection with any disclosed form or embodiment of the invention may be incorporated in any other disclosed or described or suggested form or embodiment as a general matter of design choice. It is the intention, therefore, to be limited only as indicated by the scope of the claims appended hereto.

CLAIMS

What is claimed is:

1. A method of wirelessly communicating a message from a sender to a recipient in a local environment, comprising the steps of:

positioning an information beacon in the local environment, said information beacon having a memory and a transceiver and being capable of transmitting messages in an operating region associated with said beacon;

wirelessly transmitting the message from the sender to said beacon;

storing the message in memory in said beacon;

detecting the presence of a recipient device when the recipient device is located in the operating region of said beacon; and

wirelessly transmitting the message from said beacon to the recipient device.

2. The method of claim 1, further comprising the step of encrypting the message prior to storing the message in said beacon memory, and decrypting the message after the message is received by the recipient device.

3. The method of claim 1, wherein said detecting step further comprises the step of transmitting a command from the recipient device to said beacon to transmit the stored message to the recipient device.

4. The method of claim 1, wherein said beacon and the recipient device employ Bluetooth technology.

5. The method of claim 1, wherein the recipient device has an assigned unique address code and

wherein said detecting step comprises detecting the unique address code.

6. The method of claim 5, further comprising the step of designating the message with the address code of the recipient device.

7. The method of claim 1, further comprising the step of assigning a time period to the message during which the message will be transmittable from said beacon to the recipient device.

8. The method of claim 7, further comprising the step of deleting the message from said beacon after the time period expires.

9. The method of claim 8, further comprising the step of deleting the message from said beacon after the message is transmitted to the recipient device.

10. The method of claim 3, wherein said step of wirelessly transmitting the message from the sender to said beacon further comprises the steps of wirelessly transmitting a plurality of messages having topic categories, and wherein said step of transmitting a command from the recipient device to said beacon further comprises the step of selecting specific categories of messages for transmission by said beacon to the recipient device.

11. The method of claim 1, wherein said recipient device is a mobile phone.

12. A method of communicating a message from a sender device to a recipient device in a wireless local area network having a plurality of wireless beacons in communication with each other and a host, with each beacon containing a memory, and a transceiver, and being operable in a corresponding operating region, comprising the steps of:

wirelessly transmitting a message from the sender device to a specific one of said plurality of beacons currently serving the sender device;

storing the message received by said specific one of the plural beacons in a memory;

detecting the presence of the recipient device when the recipient device enters the operating range of a particular one of said plural beacons currently serving the recipient device;

retrieving the stored message by said particular beacon; and

wirelessly transmitting the retrieved message from said particular beacon to the recipient device.

13. The method of claim 12, wherein said step of wirelessly transmitting the message to said specific one beacon comprises the step of transmitting the message to a second beacon in communication with said specific one beacon, and forwarding the message from said second beacon to said specific one beacon.

14. The method of claim 13, wherein said step of storing the message comprises storing the message in the memory of said second beacon.

15. The method of claim 12, further comprising the step of encrypting the message prior to storing the

message in memory, and decrypting the message after the message is received by the recipient device.

16. The method of claim 12, wherein said detecting step further comprises the step of transmitting a command from the recipient device to said particular beacon to transmit the stored message to the recipient device.

17. The method of claim 12, wherein said plurality of transceiver beacons and the recipient device employ Bluetooth technology.

18. The method of claim 12, wherein the recipient device has an assigned unique address code and wherein said detecting step comprises detecting the unique address code.

19. The method of claim 18, further comprising the step of designating the message with the address code of the recipient device.

20. The method of claim 12, further comprising the step of assigning a time period to the message during which the message will be transmittable from said particular beacon to the recipient device.

21. The method of claim 20, further comprising the step of deleting the message from memory after the time period expires.

22. The method of claim 12, further comprising the step of deleting the message from memory after the message is transmitted to the recipient device.

23. The method of claim 13, further comprising the step of deleting the message from memory after the message is transmitted to the recipient device.

24. The method of claim 12, wherein said recipient device is a mobile phone.

25. The method of claim 12, wherein said plurality of beacons includes an information beacon.

26. The method of claim 12, wherein the wireless local area network is in communication with a mobile network.

27. The method of claim 12, wherein the wireless local area network is in communication with a global computer network.

28. A system for wirelessly communicating a message from a sender device to a recipient device in a local environment, comprising:

an information beacon positioned in the local environment, said information beacon having a memory and a transceiver and being capable of transmitting messages in an operating region associated with said beacon;

means for wirelessly transmitting the message from the sender device to said beacon;

means for storing the message in memory in said beacon;

means for detecting the presence of a recipient device when the recipient device is located in the operating region of said beacon; and

means for wirelessly transmitting the message from said beacon to the recipient device.

29. The system of claim 28, further comprising means for encrypting the message prior to storing the message in said beacon memory, and means for decrypting the message after the message is received by the recipient device.

30. The system of claim 28, wherein said means for wirelessly transmitting the message from the sender to said beacon and said means for transmitting the message from said beacon to the recipient device comprise Bluetooth technology.

31. The system of claim 28, wherein the recipient device has an assigned unique address code and wherein said means for detecting comprises means for detecting the unique address code.

32. The system of claim 28, wherein said recipient device is a mobile phone.

33. The system of claim 28, further comprising means for connecting said information beacon to a global computer network in communication with a service provider, and means for communicating a second message from the service provider to said information beacon by transmitting the second message over the global computer network.

34. A system for communicating a message from a sender device to a recipient device in a wireless local area network having a plurality of wireless beacons in



communication with each other and a host, with each beacon containing a memory, and a transceiver, and being operable in a corresponding operating region, comprising:

means for transmitting a message from the sender device to a specific one of said plurality of beacons currently serving the sender device;

a memory for storing the message received by said specific one of the plural beacons;

means for detecting the presence of the recipient device when the recipient device enters the operating range of a particular one of said plural beacons currently serving the recipient device;

means for retrieving the stored message by said particular beacon; and

means for wirelessly transmitting the retrieved message from said particular beacon to the recipient device.

35. The system of claim 34, wherein said means for wirelessly transmitting the message to said specific one beacon comprises means for transmitting the message to a second beacon in communication with said specific one beacon, and means for forwarding the message from said second beacon to said specific one beacon.

36. The system of claim 35, wherein said storing means comprises storing the message in the memory of said second beacon.

37. The system of claim 34, further comprising means for encrypting the message prior to storing the message in memory, and means for decrypting the message after the message is received by the recipient device.

38. The system of claim 34, wherein said detecting means further comprises means for transmitting a command from the recipient device to said particular beacon to transmit the stored message to the recipient device.

39. The system of claim 34, wherein said plurality of transceiver beacons and the recipient device employ Bluetooth technology.

40. The system of claim 34, wherein the recipient device has an assigned unique address code and wherein said detecting means comprises means for detecting the unique address code.

41. The system of claim 40, further comprising means for designating the message with the address code of the recipient device.

42. The system of claim 34, further comprising means for assigning a time period to the message during which the message will be transmittable from said particular beacon to the recipient device.

43. The system of claim 42, further comprising means for deleting the message from memory after the time period expires.

44. The system of claim 34, further comprising means for deleting the message from memory after the message is transmitted to the recipient device.

45. The system of claim 35, further comprising means for deleting the message from memory after the message is transmitted to the recipient device.

46. The system of claim 34, wherein said recipient device is a mobile phone.

47. The system of claim 34, wherein said plurality of beacons includes an information beacon.

48. The system of claim 34, wherein the wireless local area network is in communication with a mobile network.

49. The system of claim 34, wherein the wireless local area network is in communication with a global computer network.

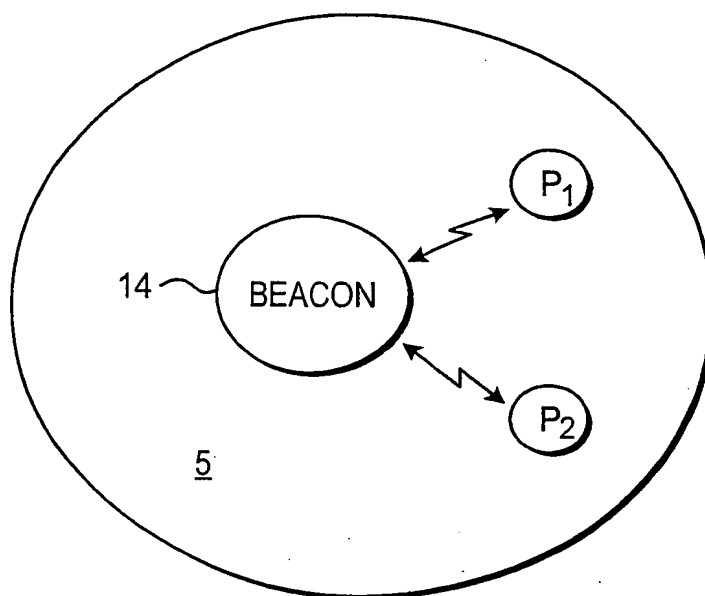
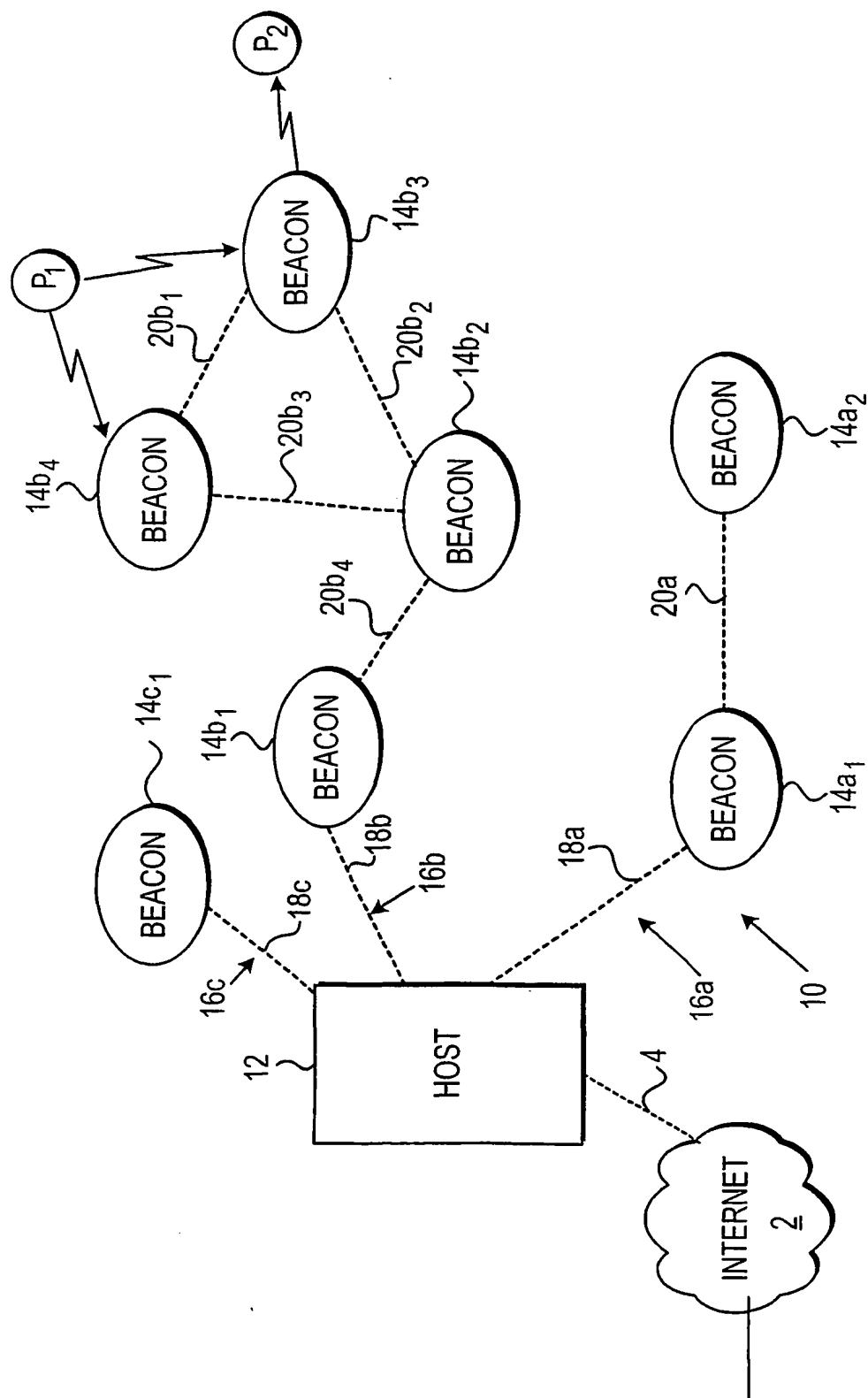


FIG. 1



**FIG. 2**

3/6

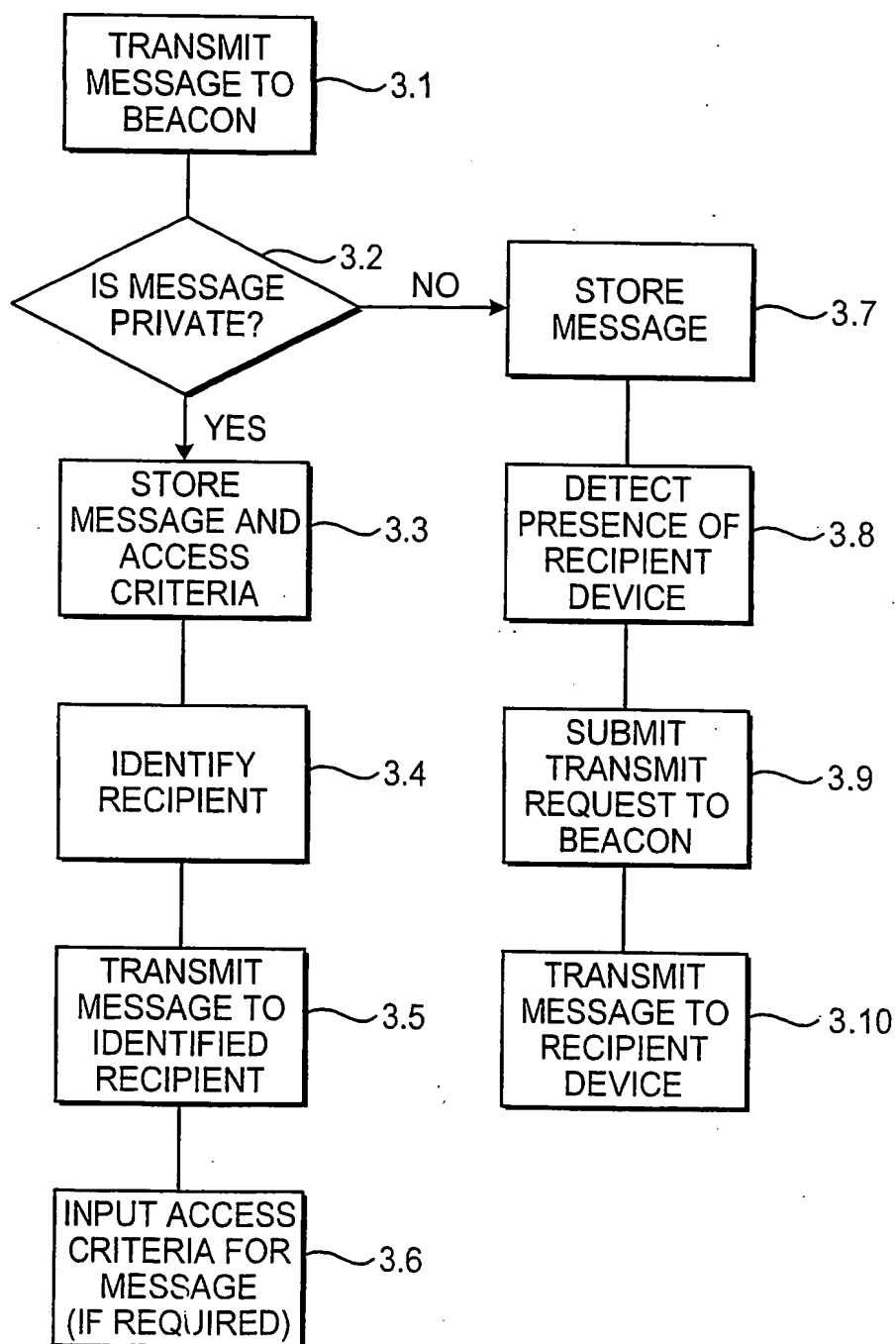


FIG. 3

4/6

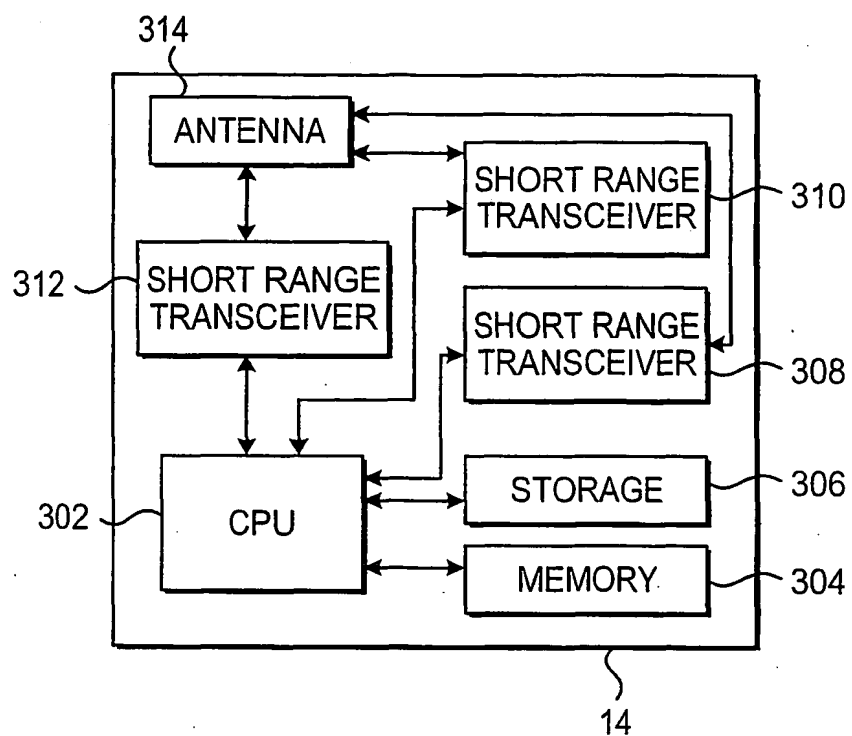
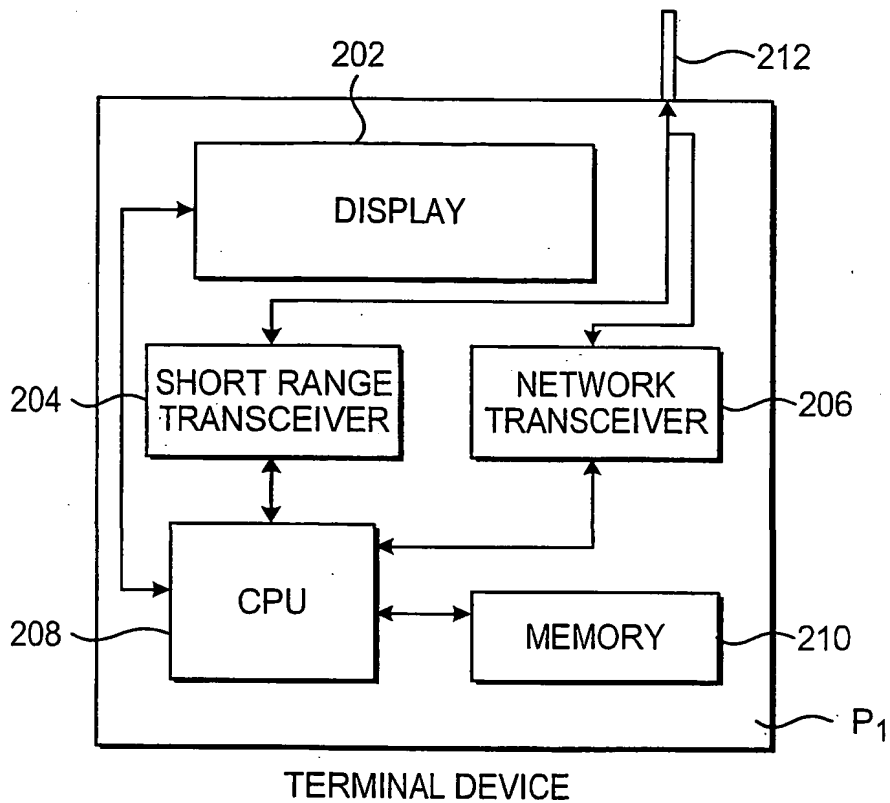


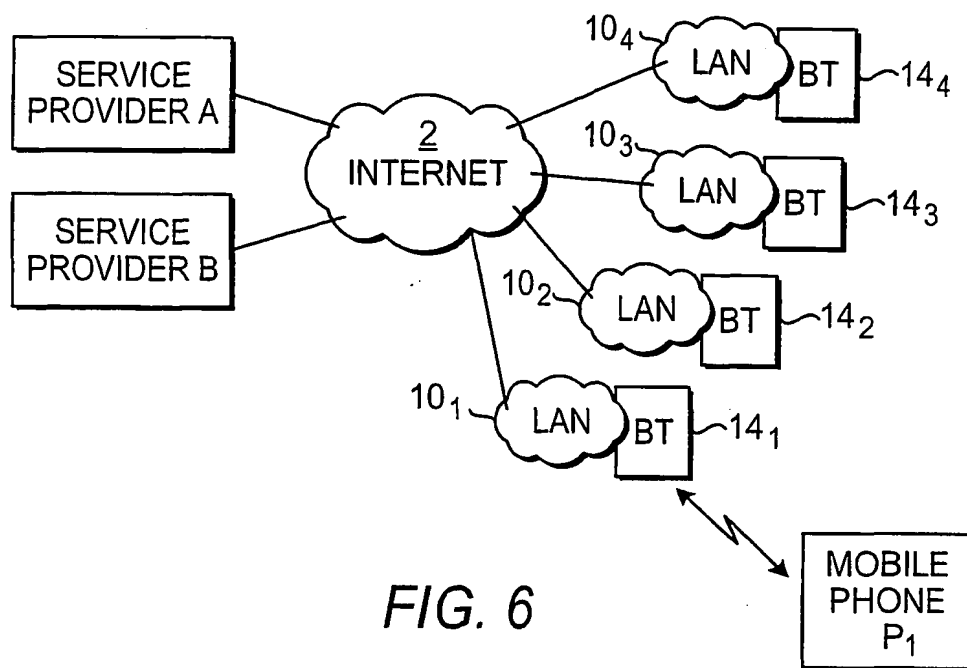
FIG. 4

5/6

**FIG. 5**



6/6



(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
17 January 2002 (17.01.2002)

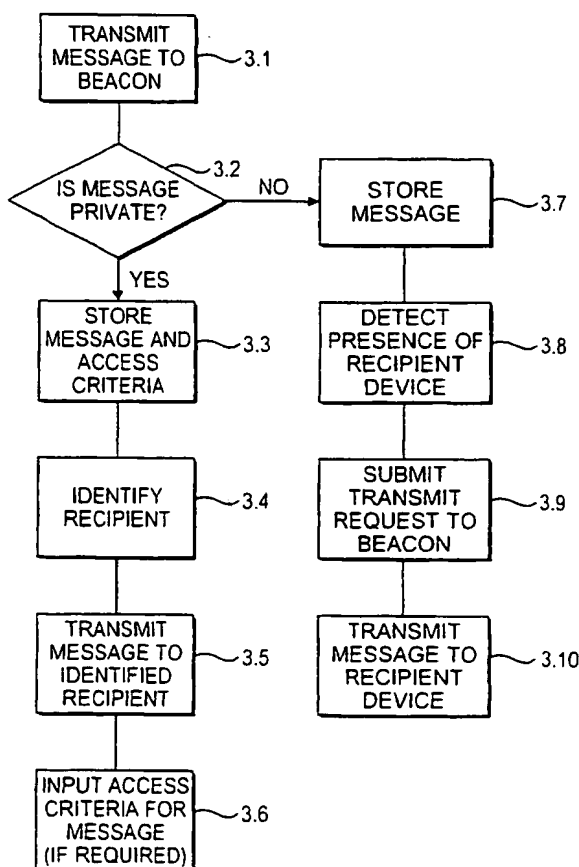
PCT

(10) International Publication Number  
**WO 02/05435 A3**

- (51) International Patent Classification<sup>7</sup>: **H04Q 7/22, 7/30** (72) Inventors: **HILTUNEN, Miska**; Breite Strasse 86a, 58452 Witten (DE). **LEMPIO, Jarkko**; Antinkatu 1 B, FIN-37100 Nokia (FI).
- (21) International Application Number: **PCT/IB01/01063**
- (22) International Filing Date: **14 June 2001 (14.06.2001)** (74) Agent: **STUART, Michael, C.**; Cohen, Pontani, Lieberman & Pavane, Suite 1210, 551 Fifth Avenue, New York, NY 10176 (US).
- (25) Filing Language: **English**
- (26) Publication Language: **English** (81) Designated States (*national*): AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.
- (30) Priority Data:  
09/612,872 10 July 2000 (10.07.2000) US
- (71) Applicant: **NOKIA CORPORATION [FI/FI]**; Keilalahdentie 4, FIN-02150 Espoo (FI).
- (71) Applicant (*for LC only*): **NOKIA INC. [US/US]**; 6000 Connection Drive, Irving, TX 75039 (US).
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European

[Continued on next page]

(54) Title: **SHORT MESSAGING USING INFORMATION BEACONS**



(57) Abstract: A short messaging communication system for communicating short messages to a user located in an operating region of the system. Information beacons or beacons which function as store and forward devices operable in a corresponding local operating region communicate with terminal devices that are located within the local operating region. Short messages can be "private" messages wherein only specified recipients are permitted access, or "public" messages whose access is not limited to specific users. A message stored on a beacon can be retrieved by a recipient when the recipient's presence in the operating range is detected, whereupon the beacon will wirelessly transmit the message to the recipient device. For private messages, a password or other security access code may be required for input into the receiving device to decipher the received message.

WO 02/05435 A3



patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

(88) Date of publication of the international search report:

2 May 2002

**Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

# INTERNATIONAL SEARCH REPORT

International Application No.

PCT/IB 01/01063

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04Q7/22 H04Q7/30

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04Q H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, INSPEC

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 876 039 A (KONINKL PHILIPS ELECTRONICS NV) 4 November 1998 (1998-11-04) page 2, line 31 -page 3, line 46 ---	1, 12, 28, 34
A	WO 97 44976 A (ERICSSON GE MOBILE INC) 27 November 1997 (1997-11-27) page 3, line 5 -page 6, line 35 ---	1, 12, 28, 34
A	WO 98 17032 A (MOTOROLA INC) 23 April 1998 (1998-04-23) cited in the application the whole document --- -/--	1, 12, 28, 34



Further documents are listed in the continuation of box C



Patent family members are listed in annex.

### \* Special categories of cited documents

\*A\* document defining the general state of the art which is not considered to be of particular relevance

\*E\* earlier document but published on or after the international filing date

\*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

\*O\* document referring to an oral disclosure, use, exhibition or other means

\*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

\*8\* document member of the same patent family

Date of the actual completion of the international search

4 March 2002

Date of mailing of the international search report

11/03/2002

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040 Tx. 31 611 epo nl.  
Fax: (+31-70) 340-3016

Authorized officer

Roberti, V

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 01/01063

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>AGRAWAL P ET AL: "A TESTBED FOR MOBILE NETWORKED COMPUTING"  COMMUNICATIONS - GATEWAY TO GLOBALIZATION.  PROCEEDINGS OF THE INTERNATIONAL  CONFERENCE ON COMMUNICATIONS. SEATTLE,  JUNE 18 - 22, 1995, PROCEEDINGS OF THE  INTERNATIONAL CONFERENCE ON COMMUNICATIONS  (ICC), NEW YORK, IEEE, US,  vol. 1, 18 June 1995 (1995-06-18), pages  410-416, XP000533020  ISBN: 0-7803-2487-0  the whole document</p>	1, 12, 28, 34
A	<p>WO 96 03843 A (NOKIA TELECOMMUNICATIONS OY  ;HUOTARI SEPPO (FI))  8 February 1996 (1996-02-08)  page 9, line 31 -page 17, line 17</p>	1, 12, 28, 34
A	<p>WO 00 30374 A (HAARAMO VILLE ;KORHONEN  PANU (FI); WIKBERG HARRI (FI); FRAEKI  JOHA) 25 May 2000 (2000-05-25)  page 6, line 6 -page 21, line 21</p>	1, 12, 28, 34

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB 01/01063

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0876039	A	04-11-1998	FR 2762952 A1	06-11-1998
			EP 0876039 A1	04-11-1998
			JP 10336722 A	18-12-1998
			US 6317591 B1	13-11-2001
WO 9744976	A	27-11-1997	US 5940767 A	17-08-1999
			AU 714769 B2	13-01-2000
			AU 3057497 A	09-12-1997
			BR 9709058 A	03-08-1999
			EE 9800384 A	15-04-1999
			EP 0897648 A1	24-02-1999
			JP 2000511018 T	22-08-2000
			WO 9744976 A1	27-11-1997
WO 9817032	A	23-04-1998	US 6069896 A	30-05-2000
			AU 4270897 A	11-05-1998
			CN 1238088 A	08-12-1999
			EP 0932960 A1	04-08-1999
			JP 2001502494 T	20-02-2001
			WO 9817032 A1	23-04-1998
WO 9603843	A	08-02-1996	FI 943447 A	21-01-1996
			AU 695880 B2	27-08-1998
			AU 2928695 A	22-02-1996
			EP 0771509 A2	07-05-1997
			WO 9603843 A2	08-02-1996
			JP 10503335 T	24-03-1998
			US 5987323 A	16-11-1999
WO 0030374	A	25-05-2000	AU 1561400 A	05-06-2000
			EP 1131959 A2	12-09-2001
			WO 0030374 A2	25-05-2000